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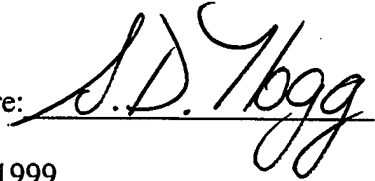
THE JOINT FORCE FIRES COORDINATOR IN MARITIME OPERATIONS

by

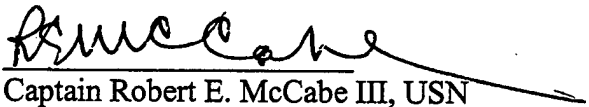
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A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

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The Big Picture

If the United States military is unable to learn any other lesson from past conflicts, it would do well to remember this one: nothing surprises like the unexpected. Repeatedly, the United States has been shocked into action by opponents who seemed to come from nowhere.¹ American corporate memories are short and future perspectives strain to see past today's events. Without a discernible peer competitor to threaten U.S. survival interests, the American public may choose tax cuts or domestic programs over an improved military. But unless the United States drastically changes the core objectives of its National Security Strategy, its future military force must remain capable of responding to contingencies ranging from humanitarian missions to multiple, high-technology theater wars.^{2,3}

To defense planners, this means finding a way to field a next-generation military with fiscal resources relatively equal, at best, to those of today. This is especially problematic from the current perspective, when the most senior military leaders are telling Congress that high operational tempos are driving down the overall readiness of today's force and slowing the pace of the military's future modernization efforts. Disturbingly, they are saying this at a time in U.S. history of relative peace. Thus, two imperatives emerge for tomorrow's leaders: (1) prepare to respond to concurrent contingencies with *no more than* the assets available today; and (2) make *better use* of existing capabilities than today's leaders and planners.

At the operational level of war, this means the joint force commander (JFC) must strive for maximum synergy among battlespace functions by completely integrating all assets at his disposal. To ensure he can achieve national and theater strategic objectives

at acceptable costs, the JFC's planning and execution process must carefully orchestrate resources throughout the depth of the battlespace in order to achieve his intent. Ad hoc staffs will present unacceptable risks to JFCs, given the high-tempo, reactive nature of future landscapes. Tomorrow's organizations and procedures must be well-rehearsed, but flexible enough to counter many different and new threats—opponents who use technology in surprising ways and who challenge the United States in unexpected arenas.⁴

Joint Fires Coordination in the Littorals

While some assessments characterize the landscape in which tomorrow's forward-deployed forces will operate as one of total uncertainty, demographic trends and recent conflicts offer a more plausible range of futures. Among the most likely of these is suggested in the Navy's 1997 strategic white paper, *Forward From the Sea . . .*, which cautions that "(s)eventy-five percent of the Earth's population and a similar proportion of national capitals and commercial centers lie in the littorals. These are the places where American influence and power have the greatest impact and are needed most often."⁵

While wars at the highest end of the conflict scale will be the most dangerous to U.S. warfighters in the littorals, and should have top priority in military preparations, the most likely future tensions will entail adversaries drawing the United States into brushfire-like conflicts in or near the littorals' dense and fast-growing urban jungles—the kind of war one writer has nicknamed "stepchild of Chechnya."⁶ Regardless of the scenario, the JFC will be required to respond rapidly and decisively. In order to achieve his desired end-state, the commander will need to leverage his own rapidly expanding arsenal of lethal and non-lethal *operational* fires, in concert with his other battlespace

functions. However, the JFC's chances of doing so will rest with his command's ability to harmoniously plan and execute these critical fires.

In the recent past, including Operation Desert Storm (ODS), operational fires largely meant *interdiction fires* delivered by *manned aircraft*. Because of this, since ODS the Joint Force Air Component Commander (JFACC) has become the defacto coordinator of joint operational fires. But impending technological advances could increase the commander's attack options and make how U.S. and allied forces deliver fires (and who owns the preponderance of delivery assets) in a maritime environment less important to the JFC than maximizing the potential of *complementary* systems in planning, executing, and deconflicting operational fires. At present, there is a distinct difference in how operational fires are coordinated, and by whom.⁷

Given the likelihood most of the wars of the future will be fought in the littorals, it seems clear that operational fires in a maritime environment should be coordinated by an expert in all available fires-related systems—including, but not limited to, manned aircraft. The thesis of this paper, then, is that in order for the JFC to achieve maximum effectiveness from operational fires in maritime operations, a joint force fires coordinator (JFFC) and a supporting section should be an integral part of the JFC's staff, empowered and manned to coordinate all operational fires.

As the idea of a JFFC as a permanent member on the JFC's staff is not a new issue to the joint community, the author will begin by identifying the advocates and opponents of the JFFC, summarize their positions, and examine how the issue is addressed in joint doctrine. The author will then provide the future context in which operational fires will be planned, delivered, and deconflicted in a maritime environment,

and will determine whether the JFC would be better served by assigning responsibility for coordination of operational fires in maritime operations to a JFFC, or by leaving it in the hands of the JFACC (and why). Finally, the author will provide recommendations to increase the effectiveness of operational fires. An underlying assumption of this paper, although not a given, is that future U.S. major operations will continue to be joint.

This paper is not intended to catalog future acquisitions and predict developmental statuses and fielding dates, or the likelihood of the acquisition of platforms, weapons systems, or munitions. The author does not try to suggest that mid-to-high intensity conflict and combat in built-up areas in the littorals are the only contingencies for which the next U.S. military or the military-after-next will need to prepare. The author's intent is to explore the effects feasible future developments will have on joint operational fires, and frame the problem by postulating what is most likely in tomorrow's maritime environments.

Where's the Beef?

Joint operational fires (lethal and non-lethal) serve the needs of the overall force.⁸ Germane to the controversy over how best to coordinate fires that serve the joint force are core warfighting philosophies of dedicated professionals, and their fundamental beliefs of what operational functions should be subordinate to others in the battlespace. Airmen (dominated by the U.S. Air Force) often have an *air-centric* orientation; ground officers tend to be (not surprisingly) *ground-centric*. Airmen essentially see airpower as a discrete battlespace function.

The Air Force views strategic attack, interdiction, and counter-air not as fires, but as capabilities with stand-alone potential for decisive impact on joint force missions. Association of airpower capabilities with fires and fire support leads to potential, and undesirable, subordination of airpower to surface and ground commanders.⁹

The U.S. Army leads the land-centric construct. The Army believes in order to fight and win the single battle, decisive force must be generated by simultaneous attack on high-payoff targets (HPTs) throughout the depth of the battlespace:¹⁰

Decisive force is an expansion of traditional land force warfighting concepts based on the integration of fire and maneuver. It establishes patterns of joint warfare easily integrated with land warfare, i.e., a pattern of joint warfare based on land warfare. Air is viewed as an enabling capability, and is subordinate to maneuver.¹¹

Many senior land-centric leaders believe the Joint Force Land Component Commander (JFLCC) should be the single manager of operational fires throughout the battlespace;¹² others propose establishing permanent, standing JFFCs and supporting joint fires elements (JFE) across combatant commands that would coordinate and synchronize joint fires with other battlespace functions.¹³ Airmen see the JFFC as an unwanted redundancy: from their view, the JFFAC is already coordinating operational fires for the JFC.

Who's right? Not surprisingly, joint doctrine fails to address the issue. Historically, operational fires have been most commonly used to shape or isolate the battlespace by preventing, disrupting, or delaying enemy reinforcements into specific areas in which a force plans to conduct its operations—essentially interdiction.¹⁴ Joint doctrine states the JFC will normally appoint a JFFAC,¹⁵ and may “. . . approve the formation within the J-3 of a Joint Fires element (JFE) . . . to accomplish fires planning and coordination.”¹⁶ Although the roles and functions of the JFFC are discussed in the third draft (1996) of the Joint Pub 3-09 (Doctrine for Joint Fire Support) revision, they were conspicuously absent from the published version.¹⁷ Joint doctrine also states the JFC will normally assign responsibilities for interdiction operations to the component

commander who has "... the preponderance of interdiction assets with theater- and/or JOA-wide [joint operations area] range and ability to control them."¹⁸

In plain language, since ODS, this meant the JFACC normally has controlled the planning, execution and deconfliction of joint operational fires. While successful in the past, this approach concerns those who believe such delegation of responsibility to a component commander will ultimately limit the JFC's ability to bring all operational fires to bear throughout the single battlespace in order to decisively accomplish his objectives at minimal friendly cost. As the following excerpt from a joint lessons-learned report suggests, the airman's natural propensity when assigning capabilities to targets could be to under-utilize systems with which he is not familiar.

Initially, the AOC [air operations center] focused only on engagement of targets through use (*sic*) of air assets, without considering how the use of Army Tactical Missile Systems (ATACMs), Tomahawk Land Attack Cruise Missiles (TLAMs), Conventional Air-launched, Cruise Missiles (CALCMs), non-lethal fires, and special operations forces (SOF) could assist in meeting CJTF [commander, joint task force] intent and objectives.¹⁹

Recently during exercises, some JFCs have chosen to appoint a JFFC and stand up a supporting JFE. However, the *ad hoc* nature of the JFE yielded predictable results—lack of rapport within the section, unfamiliarity with job assignments, and the absence of standing procedures. The result was that most tasks assigned to the JFE were completed not by the JFFC or JFE, but by the larger, established, and more practiced JFACC.²⁰

Significantly, controversy over the definitions and supporting relationships of the operational functions, the lack of a central authority on the JFC's staff charged with fires coordination, and compromise solutions to appease service and component interests have furthered system inefficiencies, with debatable gains in effectiveness. The still-

controversial Joint Targeting Coordinating Board (JTCCB) became a necessity in ODS when ground commanders felt their priority targets weren't being addressed by the JFACC.²¹ The fire support coordination line (FSCL) was moved from the realm of a permissive fire support coordination measure (FSCM) to that of a restrictive, boundary-like FSCM—essentially attempting to delineate ownership of the deep battlefield between land and aerospace forces.²² Finally, the creation of non-doctrinal FSCMs in various CINCs' areas of responsibility (AORs) has become a growth industry.²³

The Future is Soon

One way to get beyond parochialism is to focus on the future, rather than the past. If tomorrow's joint maritime operations will indeed be centered in the littorals, are the old arguments really relevant? While it is necessary to understand where such frictions originated, the well-worn doctrinal debates of today should quickly move to the periphery. Why? Because progressive warfighters are aggressively actualizing new concepts, and significant technological improvements are looming on the immediate horizon. Overlaid on future landscapes, these developments will, in time, force out old service-bred paradigms. Most new approaches will be effects-centered vice service-centered. Joint integrated planning and execution systems will be redesigned to maximize the synergy of battlespace functions while minimizing the loss of valuable resources.

One area receiving considerable attention by warfighting futurists is the *exploitation and enabling* of maneuver by fires. These visionaries are looking to enhance further the combined power of operational fires and maneuver through advances in command, control, communications, computers, intelligence, surveillance, and

reconnaissance (C⁴ISR) systems.²⁴ For maritime operations, concepts and technologies are being pursued in two main categories--machines and methods.

Machines

As noted above, manned air has been the system of choice in the delivery of operational fires. This will not necessarily be the case for the JFC during future conflicts in the littorals. While land- and carrier-based manned aircraft will still be important, they will be but one of a wide array of delivery means from which the JFC could choose to achieve desired effects, limit material losses, and minimize the risk of friendly casualties and collateral damage. For example, improvements in naval surface fires, unmanned combat aerial vehicles (UCAVs), and networked information systems, among others, will give the JFC many new ways to rapidly project power in future conflicts in urban areas, or in other projected scenarios characterized by smaller forces, higher tempos, and empty battlespace.²⁵

Naval surface fire support platforms, guns, and munitions will progressively provide the JFC greater diversity through fires with longer ranges, greater accuracies, and increased lethality, thus reducing his reliance on manned aircraft. Regardless of the availability of manned air assets, a commander will be able to project power in the littorals with all-weather, sustainable naval fires with which he can accurately attack targets from ranges exceeding 700 NM. As the force closes with the enemy, an increasingly wider array of naval surface attack options will become available to the commander by which he can destroy or neutralize stationary HPTs or those of a fleeting nature (e.g., coastal and air defenses; radar; airfields; command, control and

communications nodes; logistic centers; weapons of mass destruction; and maneuver forces).

When his surface combatants²⁶ reach their assigned over-the-horizon stations or areas, the JFC will be able to considerably extend his area of influence inland through responsive, high-volume, and sustainable naval surface fires. The modular nature of munitions, their discriminatory capabilities, and even their ability to loiter over target areas will enhance the JFC's abilities to attack a target with the optimum capability,²⁷ whether lethal, non-lethal, or a complementary combination thereof. Space-, ground surface-, or subsurface-launched projectiles, rockets or missiles may also be available to provide operational fires for the JFC during maritime operations.

Unmanned Combat Aerial Vehicles will usurp maritime missions previously performed by manned aircraft. Using UCAVs to provide operational fires will lessen the risk of casualties and lost airframes. Because friendly combat losses are becoming less acceptable to the American public (and therefore military planners), and with the costs of combat aircraft skyrocketing, "UCAVs are 'being looked at as primarily a first-few-days (of the war) kind of system' after which it probably would be more cost-effective to use manned aircraft."²⁸

Futurists seem to be looking in two directions for UCAVs: subsonic "trucks" and smaller units with increased maneuverability. The larger trucks, which would be designed for stealth instead of speed, could "... carry high-performance subsonic weapons that often could be fired at a foe from outside the range of air defenses."²⁹ Others argue that to reduce signature, UCAVs should be small, low flying, fast, highly maneuverable, and able to depart an area immediately after delivering its ordnance by

pulling "Gs" that a pilot could not withstand. Since small, low-cost UCAVs would not be restricted by the standoff distances (for survivability) that hinder manned or more expensive platforms, they could get closer to the target, attack with cheaper unguided ordnance, and rapidly depart the area.³⁰ Equally as important as their ability to place rounds on target will be their role in the delivery of non-explosive fires. Unmanned aerial vehicles ". . . are considered the platform of choice for laser, high-power microwave (HPM), and electro-magnetic pulse (EMP), or various . . . non-lethal weapons."³¹

Automation and communications capabilities will quickly facilitate the creation of a shared information network, linking numerous subsystems that will enable warfighters at all levels to "reach back and pull" an almost unlimited amount of real-time information from national, theater, and tactical sources. Among its many other utilities, this common operations database will enable targeteers and shooters at the operational level to remain abreast of friendly positions, maintain up-to-date target statuses, monitor the readiness of friendly attack assets, promulgate orders, receive real-time reports, update and disseminate FSCMs, prevent fratricide, determine bomb damage assessment (BDA), and make timely re-attack decisions on previously serviced targets.

Automated assets will also continue to perform tasks in combat operations centers, air operations centers, fire support coordination centers, fire direction centers, and other like agencies throughout the hierarchy that were previously manpower intensive. Computer technologies will be exploited to flatten and combine command and control organizations. Even if not physically collocated, commanders and staffs will be virtually collocated for the planning and execution of operational fires. One only has to

look to the U.S. Army's Effects Coordination Cell,³² the Marines' Experimental Combat Operations Center,³³ and the Navy's Ring of Fire Concept³⁴ for examples of flattened and combined agencies that leverage shared information networks to enhance the synergistic effects of operational fires and maneuver.

Method

Necessitated by finite resources and facilitated by a global communications grid, a natural evolution of changing command and staff relationships will occur within joint forces. Stove-piped, semi-autonomous organizations will be gradually stripped of traditional responsibilities to increase overall organizational efficiency and effectiveness, as joint forces most likely will no longer have the luxury of fighting undetermined, ill-equipped, and disorganized enemies who are willing to engage them on their terms in favorable weather.³⁵

As technology and the paucity of resources compels joint forces to become truly integrated, JFC staffs will move away from the numbered sections (e.g., J-1, J-2, J-3) and be reorganized to ensure synchronization of battlespace functions. For example, a fires coordinator with cognizance of a battlespace shaping cell (within the JFE) could work closely with representatives of complementary functions within that cell to plan operational fires that are focused on the commander's operational objectives. The decentralized execution of scheduled operational fires could be monitored by JFE personnel in an engagement coordination center (also part of the JFE), who would have the authority to direct or redirect assets against JFC-approved HPTs of a time-critical nature.³⁶

Distinctions between fires and fire support³⁷ will blur: operational fires will continue to be planned "top-down," but with a more careful view of seam management: fires coordinators will be required to ensure the overall apportionment and allocation of attack assets will support a smooth transition to close support of committed units. Due to constrained resources, the amount of overlapping and redundant delivery systems available for operational fires and fire support of engaged units will be greatly reduced. Netted communications systems will compensate for the loss of this extravagance. Computers with increasingly powerful processors, linked by digital communications, and supported by "pipes" with larger throughput will rapidly assess mission priorities, ammunition availability, and statuses of delivery assets; assign the best available attack assets to missions; deconflict airspace: check friendly unit locations; and clear fires.

FSCMs, whose design was previously oriented towards linear battlefields, will evolve. With the help of advanced computer systems, FSCMs will be structured to enable increased response time and to allow more permissive target engagement, while at the same time ensuring force protection. Airspace management also will be especially critical in the delivery of operational fires in the littorals: deconfliction of ground and naval surface fires, loitering munitions, rockets, missiles, UCAVs, manned aircraft, and other attack assets will be a challenge, but not an insurmountable hurdle. For example, the Marine Corps' *Hunter Warrior* experiments suggest deconfliction could be reliably automated as follows:

... radar coupled with computer management systems will be needed to predict each projectile and air vehicle flight path ... The system will plan ingress and egress routes for aircraft and optimal firing trajectories and timing to allow full engagement of the enemy without interfering with flight operations.³⁸

Future automated systems could also include designs to increase pilot in-flight situational awareness as well. Another author proposes that a "... deconfliction tool should build a bubble around each aircraft, missile and extended-range munition. Having deconfliction information sent automatically to the cockpit will let pilots know when they are steering into danger."³⁹

It's the Function, Stupid!

For the immediate future, manned aircraft will be used to service the majority of the JFC's operational targets in the littorals. In the very near-term, then, a common sense answer could be to leave the coordination of operational fires in the hands of the JFFAC. But it is clear the efficiency and effectiveness of the joint force will quickly degrade if the JFC continues to delegate the coordination of operational fires in the littorals to a component commander. Delegation means the JFC will forfeit his ability to directly influence the action; it also means he will be unable to wholly leverage the full power of his fires that will be exponentially enhanced through improvements in technology, procedures, and organizational structure. Who owns the assets will logically become less important than what is to be accomplished—timely and accurate fires that support the force as a whole. In light of the fluid nature of the future battlespace, the disparate demands that will be made of the joint force, and the shrinking resource base upon which future JFCs will be able to draw to achieve their objectives, the ability to optimize the effects of operational fires will be increasingly critical to mission accomplishment. Therefore, the following conclusions and recommendations are fundamental for joint force success in future maritime operations.

Conclusions

1. In maritime operations, in order to facilitate an integrated planning and execution process that ensures the JFC's operational fires are closely synchronized with other battlespace functions, and to ensure his operational fires support his stated objectives, *the JFC will require a fires expert on his battle staff charged with the responsibility of and the authority to coordinate operational fires.*
2. Airpower will never be considered a separate operational battlespace function. The attack of operational targets by U.S. aerospace assets will merely be delivery options available to the JFC.
3. The number of manned attack aircraft in the United States' inventory will proportionally decrease as the use of other improved or new platforms, delivery means, and munitions increasingly become the means of choice for servicing operational targets in the littorals.
4. Intermediate headquarters (e.g., JFACCs and JFLCCs) will be eliminated.⁴⁰
Automation, communications, and C4ISR technologies will allow a real-time, common operating view of the battlespace. Aided by this capability, a JFE on the JFC's staff will be able to more effectively plan, execute, and deconflict operational fires than would a component commander.⁴¹
5. Targeting by committee (read JTCCB) will be an inefficiency the JFC can ill-afford in fluid and dynamic future maritime operations.

Recommendations

1. *The JFE, led by the JFFC, should become a permanent, primary staff section across combatant commands. The JFFC should be solely responsible to coordinate operational fires strictly in support of the JFC's stated objectives.*⁴²
2. In the near future, JFCs' staffs should be reorganized along functional lines to facilitate the synergistic use of all resources, and the synchronization of all operational capabilities in the maritime battlespace.
3. Subordinate commanders should be represented in the JFE by liaison officers from their organization. Subordinate commanders should not be required to man cells in other components' headquarters to ensure targets in their areas of interest are being serviced.
4. Joint Targeting Coordination Boards should be eliminated. (This won't preclude subordinate commanders from presenting their views to the JFC, alone or as a group, in person or by virtual means.)
5. Separate military occupational specialties in each service should be created in which officers and enlisted personnel are specifically trained to integrate all fires into combined arms operations. Schools and mobile training teams should provide common training across service lines. Career development programs and incentives would be aimed at developing proficient fires and fire support coordinators at all levels.
6. Staff reorganization along the lines of battlespace functions should be considered for all operating environments, whether maritime or continental. For example, parallelism in organizational structures would make the "battle hand-over" process

smoother if a naval expeditionary force, with an enabling mission, passes control of the battlespace to a larger force for subsequent sustained operations ashore.

Closing

Letting go of the past is necessary in order to move into the future. Tomorrow's military force and the force-after-next will certainly operate in the world's littorals, a landscape that will be dynamic, chaotic, and unforgiving. Surviving the littoral battlespace of the future will require a self-contained joint force that is fully prepared when called to meet symmetric and asymmetric challenges across the full spectrum of operations. Synergistic management of operational fires, in concert with other battlespace functions, will be critical to setting conditions for battlefield success in the littorals—and perhaps for delivering the decisive, least-cost blow to the enemy's strategic and operational centers of gravity. To guarantee flexible, responsive, and decisive fires to support his operational objectives, the JFC should empower a JFFC to coordinate all operational fires in maritime operations.

¹ "... (C)onflict with opponents with significant capabilities can spring up from seemingly nowhere ... [and] ... (n)ew enemies may suddenly and unexpectedly acquire a leverage versus the United States in a short period of time ... if history is any guide, the United States will be surprised when the time comes." Eliot A. Cohen, "Airpower in the Next War, and the Marine Corps," Marine Corps Gazette, November 1995, 39.

² The current National Security Strategy defines the core U.S. security mission as "... (t)o enhance ... [its] security, (t)o bolster ... economic prosperity, [and] (t)o promote democracy abroad" William J. Clinton, A National Security Strategy for a New Century (Washington, D.C.: October 1998), iii.

³ The current National Military Strategy (NMS) says U.S. military forces will "...remain globally engaged to shape the environment and create conditions favorable to US interests and global security." The NMS also says American forces will be required to respond "...to the full spectrum of crises in order to protect...national interests." John M. Shalikashvili, National Military Strategy of the United States of America (Washington, D.C.: 1997), 1.

⁴ Concepts Division, Marine Corps Combat Development Command, United States Marine Corps Warfighting Concepts for the 21st Century (Quantico, VA: 4 January 1996), VI-3.

⁵ Jay L. Johnson, "Forward...From the Sea: the Naval Operational Concept," (Washington, D.C.: March 1997), 2.

⁶ U.S. Marine Corps, Concepts and Issues '98: Building a Corps for the 21st Century (Washington, D.C.: 1998), 14.

⁷ William R. Fearn, "Joint Force Fires Coordination: Towards a Joint Force Answer," (Unpublished Research Paper, U.S. Naval War College, Newport, RI: 13 June 1997), 1-2.

⁸ Operational fires should not be confused with fire support. "Operational fires ... [are] the application of firepower to achieve a *decisive* impact on the conduct of a campaign or major operation. They are not fire support; hence the success of operational maneuver is not necessarily dependent on those fires." Milan Vego, "On Operational Art (Third Draft)" (Unpublished Collection of Articles and Notes, U.S. Naval War College, Newport, RI: September 1998), 195.

⁹ Fearn, 6.

¹⁰ Martin L. Vozzo and others, "Who Should Coordinate Fires in the Battle Interdiction Area?" Field Artillery, September-October 1995, 40.

¹¹ Fearn, 35.

¹² Vozzo and others, 40.

¹³ Rudy T. Veit, "Joint Targeting: Improving the Playbook, Communications, and Teamwork," (Unpublished Research Paper, U.S. Army War College, Carlisle, PA: 11 April 1996), 21.

¹⁴ "... (O)ne of the most common purposes of operational fires is to isolate or 'shape' the battlefield by preventing the arrival or at least slowing down the movement of enemy troop, air, or naval reinforcements into an area where one's own major operation ... is to be conducted ..." Vego, 203. The joint definition of interdiction is "(a)n action to divert, disrupt, delay, or destroy the enemy's surface military potential before it can be used effectively against friendly forces." Air interdiction is "(a)ir operations conducted to destroy, neutralize, or delay the enemy's potential before it can be brought to bear against friendly forces at such a distance from friendly forces that detailed integration of each air mission with the fire and movement of friendly forces is not required." Joint Chiefs of Staff, Department of Defense Dictionary of Military and Associated Terms (Joint Pub 1-02) (Washington, D.C.: 23 March 1994 as amended through 6 April 1999), 226 and 18.

¹⁵ Joint Chiefs of Staff, Doctrine for Joint Operations (Joint Pub 3-0) (Washington, D.C.: 1 February 1995), II-15.

¹⁶ Joint Chiefs of Staff, Doctrine for Joint Fire Support (Joint Pub 3-09) (Washington, D.C.: 12 May 1998), I-5.

¹⁷ The JFE is the product of a compromise on the JFFC issue between air-centric and land-centric theorists. The third draft of Joint Pub 3-09 identified the need for a JFFC across theaters (Veit, 16). The reader can draw his own conclusions as to who won the argument.

¹⁸ Joint Chiefs of Staff, Doctrine for Joint Interdiction Operations (Joint Pub 3-03) (Washington, D.C.: 10 April 1997), II-7-8.

¹⁹ "Joint Force Fires Coordinator," JULLS No. 12750-48471, 18 Dec 96. Unclassified. Joint Universal Lessons Learned System (JULLS), Available on Naval Tactical Information Compendium (NTIC) CD-ROM Series A, Washington, D.C.: Naval Tactical Support Activity, September-October 1998. UNCLASSIFIED.

²⁰ Fearn, 71 and JULLS No. 12750-48471.

²¹ Fearn, 69 and Veit, 12-13. For clarification purposes, the JTCB is "(a) group formed by the joint force commander to accomplish broad targeting oversight functions that may include, but aren't limited to coordinating targeting information, providing targeting guidance and priorities, and preparing and/or refining joint target lists. The board is normally comprised of representatives from the joint force staff, all components, and if required, component subordinate units." Joint Pub 1-02, 247.

²² Although the current joint definition of a the FSCL states that "... it does not divide an area of operations by defining a boundary between close and deep operations or a zone for close air support ...," it indeed comes very close to imposing the coordination requirements normally associated with a boundary. As a rule, fires by an outside agency into a commander's assigned zone must be approved by the owning commander before execution. The joint FSCL definition also states, in part "(t)he FSCL applies to all fires of air, land, and sea-based weapon systems using any type of ammunition. Forces attacking targets beyond an FSCL must inform all affected commanders in sufficient time to allow necessary reaction to avoid fratricide.... Coordination of attacks beyond the FSCL is especially critical to commanders of air, land, and special operations forces. In exceptional circumstances, the inability to conduct this coordination will not preclude the attack of targets beyond the FSCL. However, failure to do so may increase the risk of fratricide and could waste limited resources." Joint Pub 1-02, 173. As a contrast, this confusing and restrictive definition is considerably different from older definitions, such as "A Fire Support Coordination Line (FSCL) is a line beyond which all fire support means may attack targets without coordination." Department of the Army, Fire Support Handbook for the Maneuver Commander (Training Circular 6-71) (Washington, D.C.: 10 November 1988), 49.

²³ "The deep battle synchronization line (DBSL) currently used in Korea, the reconnaissance interdiction prioritization line (RIPL) used in the past in Europe, the Kill Boxes of Desert Storm, other non-doctrinal fire support coordination measures are examples of compromise solutions [to the FSCL controversy]. Non-doctrinal FSCMs are attempts to procedurally compensate for the lack of a joint force coordination capability." Fearn, 72. Non-doctrinal FSCMs can be confusing (and potentially dangerous) for units and individuals from outside a theater, or Area of Responsibility, who are deployed to a contingency or training exercise to augment a JFC's forces.

²⁴ Concepts Division, Marine Corps Combat Development Command, "Advanced Expeditionary Fire Support--the System After Next," Lkd. Concepts Division, Marine Corps Combat Development Command at "Concepts," <<http://www.concepts.quantico.usmc.mil>> (20 January 1998), 6.

²⁵ Fearn, 25.

²⁶ For example, the DD-21 Land Attack Destroyer, which is currently on the drawing board, has a mission "... to provide an advanced level of land attack in support of the ground campaign, and to contribute to naval, joint and combined battlespace dominance in littoral operations." These ships will be equipped with next-generation 5"/62 guns; their range will be from 41 (minimum) to 63 NM (objective). The Advanced Gun System is the follow-on system, with fielding projected sometime in 2009. This system is expected to fire a full suite of 155-mm ammunition, and achieve ranges out to 100 nautical miles (NM). Naval guns will primarily fire rocket-assisted extended-range guided munitions (ERGMs), carrying dual-purpose improved conventional munitions (DPICM). The DD-21 will also be equipped with the Land Attack Standard Missile (LASM), which will consist of a "... blast fragmentary warhead, GPS/INS [global positioning system/ inertial navigation system] and will have a range of 110 to 150 NM." Kevin C. Rogers, "Fires for Future Amphibious Operations: OMFTS," Field Artillery, January-February 1999, 25.

²⁷ The Vertical Gun for Advanced Ships (VGAS) will present another opportunity to expand JFC attack options. It features "... vertically mounted ... guns coupled with an automatic weapons handling magazine currently envisioned to stow 1,500 rounds in a Vertical Launching System [VLS] ... module. VGAS would fire up to 20 rounds per minute of rocket-boosted, guided projectiles to 100 NM or more" Researchers are also exploring the possibilities of extending gun ranges out to 400 NM with an electronic rail gun. As the achievable efficiencies for gunpowder propellants are limited, these guns would

fire inert rounds "... using two electronically conductive rails that carry the current that propels the munitions." As the explosiveness of the inert round would be a function of kinetic energy, the round would be smaller. Coupled with a lack of storage requirements for propellants, the smaller round would markedly increase the number of rounds that could be stored in a ship's magazine. Other munitions and missiles would extend the distance from which a JFC could accurately attack his adversary. SCRAMShell (tube-launched with a 100-NM range) and SCRAMStage (fired from a vertical launch system, or VLS, with a 240-NM range) will be hypersonic rounds and missiles, respectively, which will penetrate 8 to 12 feet of reinforced concrete. Loitering munitions such as Forward Air Support Munition (FASM -- gun-launched with a 100-NM range) will be attack and observation systems that will transform into airframes, and fly to assigned target areas. There they will remain available to deliver ordnance for 2 to 4 hours. Brilliant Anti-armor Technology (BAT) submunitions (deployed from missiles) will employ discriminatory top-attack munitions. A proposed naval version of the ATACMS (NATCMS) could be fired from a vertical cell and achieve ranges of 160 NM. Cruise missile variations could range from the SeaSlam (75-NM range) which would carry a 500-pound payload, to the FastHawk (700+-NM range), a supersonic version of the TLAM. The NTACMS and naval surface-launched missiles could accurately deliver payloads from 250 to 1200 pounds. Eric H. Law, "Decisive Impact Ashore: Revolutions in Firepower and Campaigning from the Sea," (Unpublished Research Paper, Naval Postgraduate School, Monterey, CA: June 1988), 23-34.

²⁸ David A. Fulghum, "Next Generation UCAVs will Feature New Weapons, Engines," Aviation Week and Space Technology, 3 August 1998, 72.

²⁹ Ibid., 71.

³⁰ Andrew A. Probert, "Uninhabited Combat Aerial Vehicles: Remove the Pilot?" Airpower Journal, Winter 1997, 86.

³¹ Fulghum, 71.

³² Toney Strickland, "Fires: the Cutting Edge for the 21st Century," Field Artillery, May-June 1998, 26.

³³ Marine Corps Warfighting Laboratory, Exploiting Hunter Warrior (Quantico, VA: August 1997), 13-14.

³⁴ Ross Mitchell, "Naval Fire Support: Ring of Fire," Proceedings, November 1997, 55.

³⁵ Joint forces operating in the littorals "... must be capable of operating in any environment against a wide range of potential adversaries. ... (E)ven those who are relatively unsophisticated ... will be capable of employing modern weapons systems that are more capable in terms of range, accuracy, and lethality than those available today." Concepts Division, Marine Corps Combat Development Command, "Advanced Expeditionary Fire Support -- the System After Next", 2.

³⁶ The basic idea for these organizations is taken from Exploiting Hunter Warrior, 13-15.

³⁷ Fire support coordinators in engagement coordination cells of subordinate maneuver units would be responsible for planning and executing fire support for committed maneuver units. Subordinate units will be allocated ammunition and assigned priorities of fire for delivery assets based on the designation of main and supporting efforts by the JFC for each phase of an operation.

³⁸ Marine Corps Warfighting Laboratory, Urban Warrior Conceptual Experimental Framework (Quantico, VA: 21 April 1998), 21.

³⁹ Mitchell, 56.

⁴⁰ The JFFAC would lose his area air defense authority to the force protection coordinator. His airspace control authority would be moved under the authority of the fires coordinator. Air forces commanders would execute strategic attack, interdiction operations, and close air support in accordance with their assigned missions and the JFC's targeting priorities. The JFLCC's duties would move to the maneuver coordinator on the JFC's staff.

⁴¹ Delivery unit commanders' responsibilities will focus on final weaponeering, scheduling specific resources against missions, attacking targets, equipment maintenance, self-defense, reporting damage assessments, the overall readiness of personnel, and carrying out the JFC's intent through the direction of the JFFC.

⁴² The JFFC's overall responsibilities would include:

1. Recommending targeting priorities to the JFC;
2. Apportioning and allocating joint fires delivery assets and ammunition;
3. Producing the JFC's high-payoff target list, attack guidance matrix, and target selection standards (developed in conjunction with the intelligence coordinator);
4. Planning all operational fires;
5. Assisting the intelligence coordinator develop the collection plan to ensure it supports the commander's targeting priorities;
6. Synchronizing operational fires with other battlespace activities;
7. Publishing the joint target list;
8. Disseminating schedules of operational fires;
9. Preventing fratricide from operational fires;
10. Managing the airspace in the area of operations;
11. Publishing the protected target list (developed in conjunction with other primary and special staff officers);
12. Disseminating FSCMs; and
13. Attacking operational high payoff time-critical targets in accordance with the JFC's attack guidance.

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